

PST-100HL

Plate Shaker-Thermostat



**Operating Manual
Certificate**

for version
V.1AW

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1. Safety precautions

The following symbols mean:



Caution!

Make sure you have fully read and understood the present Manual before using the equipment. Please pay special attention to sections marked by this symbol.



Caution!

Hot surface! Platform surface becomes very hot during use. Always use protective cotton gloves to install or remove microtest plates and to fix or release fixation holder when set temperature is higher than 60°C.

GENERAL SAFETY

- Use only as specified in the Operating Manual provided.
- The unit should be saved from shocks or falling.
- The unit must be stored and transported in a horizontal position (see package label).
- After transportation or storage keep the unit under room temperature for 2-3hrs before connecting it to the electric circuit.
- Use only cleaning and decontamination methods recommended by the manufacturer.
- Do not make modifications to the design of the unit.

ELECTRICAL SAFETY

- Connect only to the external power supply unit with voltage corresponding to that on the serial number label.
- Use only the external power supply unit provided with this product.
- Ensure that the switch and external power supply unit are easily accessible during use.
- Do not plug the unit into an ungrounded power socket, and do not use an ungrounded extension lead.
- Disconnect the unit from electric circuit before moving.
- Disconnect the external power supply unit from power socket to turn off the unit.
- If liquid penetrates into the unit, disconnect it from the external power supply unit and have it checked by a repair and maintenance technician.
- Do not operate the unit in premises where condensation can form. Operating conditions of the unit are defined in the Specifications section.

DURING OPERATION

- Do not leave the operating unit unattended.
- Do not impede the platform motion.
- Do not operate the unit in environments with aggressive or explosive chemical mixtures.
- Do not operate the unit if it is faulty or has been installed incorrectly.
- Do not use outside laboratory rooms.
- Do not check the temperature by touch. Use a thermometer.

BIOLOGICAL SAFETY

- It is the user's responsibility to carry out appropriate decontamination if hazardous material is spilt on or penetrates into the equipment.

2. General Information

PST-100HL Plate Shaker-Thermostat is designed for shaking 2 standard 96-well microplates in the thermostating mode. Plate Shaker-Thermostat was designed using the multi-system principle, which allows using it as three independent devices:

- 1) incubator for lasting incubation of micro quantities (insect, plant cell cultures, etc.) in plates;
- 2) microplate Shaker for operation in the cold room or other conditions, which do not require temperature stabilization;
- 3) microplate Thermo-Shaker for immunochemistry and molecular diagnostics, where the requirements to the result reproducibility and thus to the precise method regulation are particularly high.

A distinctive feature of BioSan plate thermal shakers is the patented two-side plate heating that allows to achieve full correspondence of the set and actual temperature in the plate wells.

Thermo-Shaker PST-100HL provides:

- soft or intensive sample shaking;
- rotation speed regulation, stabilization and indication;
- even shaking amplitude throughout Shaker-Thermostat platform;
- required operation time setting and indication;
- automatic stopping of the platform movement after the set time expires;
- current operation time indication;
- setting and indication of the required temperature.

The device can be used in:

- cytochemistry for in situ reactions;
- immunochemistry for immunofermentative reactions;
- biochemistry for enzyme and protein analysis;
- molecular biology for matrix analysis, DNA and RNA analyses.

The maximum guaranteed number of diagnostic cycles in the Thermo-Shaker mode, which require 15-30 min work in one cycle, is 7000-14000 times. External 12V power supply unit is used to power the device. It makes it safe to work in the cold room, where condensation may cause leakage current from electric circuit.

PST-100HL innovation is appliance of the newest gradient two-cascade peripheral heating of the platform for two 96-well plates technology. During the Shaker-Thermostat with heating up to 100°C designing Biosan successfully solved the problem of high temperature uniformity throughout the whole platform surface in stable mixing conditions up to 1200 rpm.

3. Getting started

3.1. Unpacking.

Remove packing materials carefully and retain them for future shipment or storage of the unit. Examine the unit carefully for any damage incurred during transit. The warranty does not cover in-transit damage.

3.2 Complete set. Package contents:

- PST-100 HL Plate Shaker-Thermostat 1 piece
- spare rubber belt 2 pieces
- external power supply unit 1 piece
- power cord 1 piece
- Operating Manual; Certificate 1 copy

3.3. Set up:

- place the unit upon even horizontal non-flammable surface away from any flammable materials (not less than 30 cm);
- remove protective film from the display;
- plug the external power supply unit into the socket at the rear side of the unit and position the unit so that there is easy access to the power switch and the external power supply unit.

4. Operation

Recommendations during operation

- Please check the plates before using. Don't heat the plates over the melting point of the material they are made of.



Caution!

Surfaces of the platform become very hot during the use over 60°C. To place or remove the microplate use the protective cotton gloves.

- 4.1. Connect the external power supply unit to a grounded power socket and set the power switch located on the rear panel of the unit to position I ("ON").
- 4.2. The display will turn on with the upper line (**Set**) showing time, speed and temperature set earlier and the lower line (**Actual**) showing current readings of the same parameters (thermoblock temperature °C, which automatically starts rising according to the temperature set in the upper line). The time of temperature stabilisation depends on the initial temperature.
- 4.3. **Setting the parameters.** Use the readings in the upper line of the display (**Set**), while setting the required parameters.
 - 4.3.1. **Setting time (TIME).** Using the ▲ and ▼ keys (Fig. 1/1) set the required working time interval in hours and minutes (increment 1 min). Pressing the key for more than 3 s will increase the increment.
 - 4.3.2. **Setting speed (RPM).** Using the ▲ and ▼ keys (Fig. 1/2) set the required shaking speed (increment 10 RPM). Pressing the key for more than 3 s will increase the increment.
 - 4.3.3. **Setting temperature (T,°C).** Using the ▲ and ▼ keys (Fig. 1/3) set the necessary temperature (increment 0.1°C). Pressing the key for more than 3 s will increase the increment.



Caution!

The platform heating can be turned off only by setting the required temperature below 25°C (the display will show OFF - T(°C) - **Set**). It can be used in cold rooms as a mixing device without thermal regulation in this mode.

- 4.4. **Program execution.** After the thermal stabilisation of the unit (when the set and current temperature readings become the same):
 - 4.4.1. Place microplates on the platform and fix it with the special holder by pressing it against the plate covers.

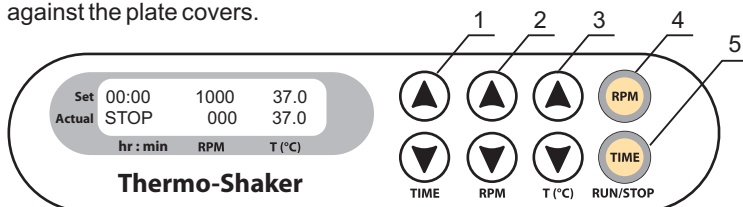


Fig.1 Control panel

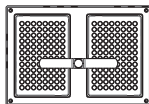
**Caution!**

The microplate fixation screw must always be tightened to avoid damage. Tighten the fixation screw completely when microplates are removed from or placed on the platform. Do not close the lid if the microplate fixation screw is not tightened to avoid damage.

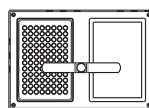
**Caution!**

Load only pairs of microplates for best fixing.

✓
Correct loading



✗
Wrong loading



- 4.4.2. Press the **RPM-RUN/STOP** key (Fig. 1/4). The platform will start rotating and the timer indicator will start counting up the time interval (with 1 min precision).
- 4.4.3. After finishing the program the platform motion will stop and the timer will be showing the flashing reading STOP accompanied by the repetitive sound signal until the **RPM-RUN/STOP** key is pressed.

**Caution!**

At the end of the set time period the platform movement is stopped automatically, but the heating has to be stopped by reducing the temperature using the ▼ T(°C) key (Fig. 1/3 lower key) till the OFF sign appears in the upper part of the display.

- 4.5. If the working time is not set (or is reset) and the timer indicator in the upper line shows 00:00, pressing the **RPM-RUN/STOP** key will start continuous operation of the Thermo-shaker (timer indicator will start counting up the time interval in the lower line (Actual)) until the **RPM-RUN/STOP** key is pressed again.

**Note.**

The platform temperature will be constantly maintained in accordance with the set temperature. This allows using the device again without pre-heating.

- 4.6. The timer can be reset during operation if required. Press the **TIME-RUN/STOP** key once (Fig. 1/5) to stop the timer. Press the **TIME-RUN/STOP** key again to restart the timer.
- 4.7. The platform motion can be stopped at any time by pressing the **RPM-RUN/STOP** key. In this case the program realisation and the platform motion will stop and the timer will switch into the STOP mode saving previously set time. Press the **RPM-RUN/STOP** key to repeat the operation with the same time and speed.
- 4.8. When lid is open the platform and lid heating surfaces will remain hot. Please, take necessary care and use protective cloth gloves at temperatures over 60°C.
- 4.9. After finishing the operation set the power switch, located on the rear panel of the unit, in position O (Off) and disconnect the external power supply from electric circuit.

5. Specifications

The unit is designed for operation in cold rooms, incubators and closed laboratory rooms at ambient temperature from +4°C to +40°C in a non-condensing atmosphere and maximum relative humidity 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C.

5.1. Temperature specifications

- Setting range+25°C ... +100°C
- Ccontrol range.....5°C above RT to +100°C
- Setting resolution 0.1°C
- Stability (from +25°C to +60°C)±0.1°C
- Uniformity over the platform at +37°C.....±0.2°C
- Time of thermoblock heating from +25°C till +100°C 60 min

5.2. General specifications

- Speed regulation 250-1200 rpm
- Speed setting resolution 10 rpm
- Orbit 2 mm
- Timer with sound signal 1 min ... 96 hrs / non-stop
- Time setting resolution 1 min
- Display 16x2 signs, LCD
- Max. height of microwell plates 18 mm
- Number of microwell plates 2
- Platform dimensions 250 x 150 mm
- Dimensions 270x260x125 mm
- Input current / power consumption 12 V, 5 A / 60 W
- External power supply input AC 100-240 V 50/60Hz, output DC 12 V
- Weight* 5.9 kg

* Accurate within ±10%.

Replacement parts	Description	Catalogue number
Rubber belt	122 x 6 x 0.6 mm	BS-000000-S18

Company retains the right to make changes and supplements in product design aimed at enhancement of consumer performance and operation quality without prior notice.

6. Maintenance

- 6.1. If the unit requires maintenance, disconnect the unit from the electric circuit and contact Biosan or your local Biosan representative.
- 6.2. All maintenance and repair operations must be performed only by qualified and specially trained personnel.
- 6.3. Standard ethanol (75%) or other cleaning agents recommended for cleaning of laboratory equipment can be used for cleaning and decontamination of the unit.
- 6.4. Rubber belt replacement.

For maintenance of reliable operation of the device the producer recommends to replace rubber belts after 1.5 years or 2000 hours of operation time.

- Disconnect the external power supply unit from the device.
- Remove 4 fixation screws on the device bottom and remove the bottom plate.
- Replace the rubber belt (fig.2).
- Re-assemble the device.

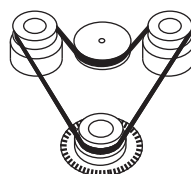


Fig.2 Rubber belt replacement

7. Warranty and Claims

- 7.1. The Manufacturer guarantees the compliance of the unit with the requirements of Specifications, provided the Customer follows the operation, storage and transportation instructions.
- 7.2. The warranted service life of the unit from the date of its delivery to the Customer is 24 months. Contact to your local distributor to check availability of extended warranty.
- 7.3. If any manufacturing defects are discovered by the Customer, an unsatisfactory equipment claim shall be compiled, certified and sent to the local distributor address. Please visit www.biosan.lv, Technical support section to obtain the claim form.
- 7.4. The following information will be required in the event that warranty or post-warranty service comes necessary. Complete and retain for your records.

Model	PST-100HL Plate Shaker-Thermostat
Serial number	
Date of sale	

8. Declaration of Conformity

Declaration of Conformity

Equipment name:	PST-100HL
Type of equipment:	Plate Shaker-Thermostat
Directive:	EMC Directive 2004/108/EC Low Voltage Directive 2006/95/EC RoHS 2011/65/EC WEEE 2002/96/EC & 2012/19/EU
Manufacturer:	SIA BIOSAN Ratsupites 7, build.2, Riga, LV-1067, Latvia
Applied Standards:	EN 61326-1: Electrical equipment for measurement, control and laboratory use EMC requirements. General requirements EN 61010-1: Safety requirements for electrical equipment for measurement, control and laboratory use. General requirements EN 61010-2-010: Particular requirements for laboratory equipment for the heating of materials EN 61010-2-051: Particular requirements for laboratory equipment for mixing and stirring

We declare that this product conforms to the requirements of the above Directive(s)



Signature
Svetlana Bankovska
Managing director



Signature
Aleksandr Shevchik
Engineer of R&D

12.06.2013

Date

12.06.2013

Date

How to choose a proper Shaker, Rocker, Vortex



PSU-20i

ES-20/60
(with heating)

- Applications:
- Microbiology
 - Extraction
 - Cell growing



PSU-10i



ES-20
(with heating)



MR-12



Volume of liquids

$10^3 \dots 10^2$ ml

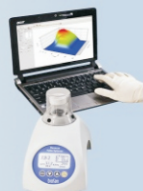
Erlenmeyer flasks, Cultivation flasks
and 50 ml tubes



Multi RS-60



RTS-1



MR-1

- Applications:
- Agglutination
 - Extraction
 - Gel staining/
destaining



Multi Bio 3D

- Applications:
- Agglutination
 - Extraction
 - Blot hybridisation
 - Gel staining/destaining



10^1 ml

Petri dishes, vacutainers
and tubes up to 15 ml



Multi Bio RS-24

- Applications:
- Microbiology
 - Extraction
 - Cell growing



V-1

- Applications:
- DNA-analysis
 - Genome sequence



PSU-2T

PST-60HL-4
(with heating)



PST-60HL
PST-100HL
(with heating)

- Applications:
- ELISA analysis
 - Hybridization

MPS-3500



TS-100 (with heating)
TS-100C (with heating
and cooling)



V-32



$10^0 \dots 10^{-3}$ ml

PCR plates, microtest plates
and Eppendorf type tubes